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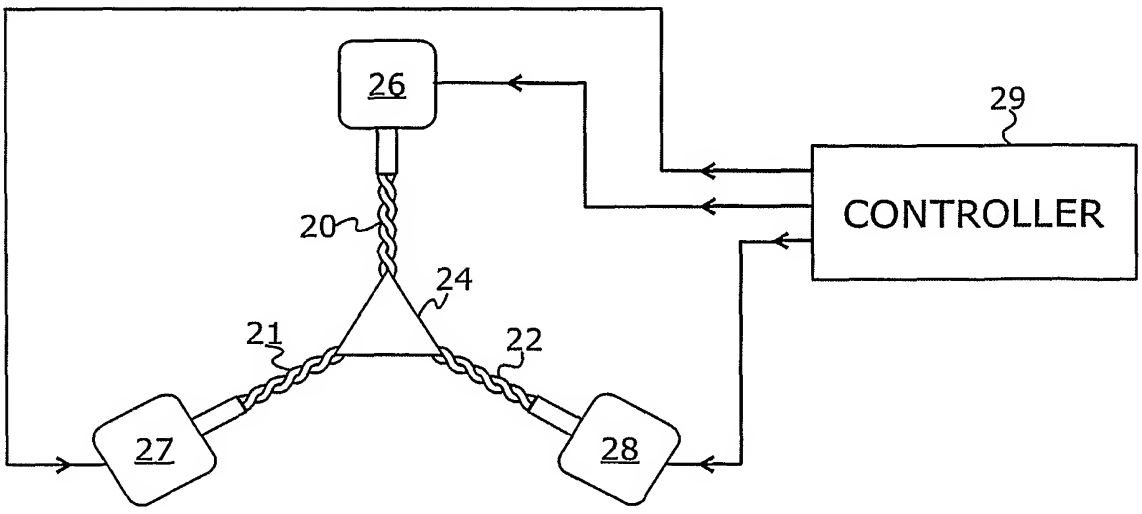
(54) **Title:** TWISTING WIRE ACTUATOR




(57) **Abstract:** A twisted wire actuator, whereby the shortening of the length of a wire or a bundle of wires, as it is twisted, is used to control the motion of an actuated element, achieving sub-micron motion resolution. The control can be performed robotically. The high resolution can be achieved without the use of gears, sliders, or high precision lead screws, thus enabling a simplified actuation system and eliminating sources of friction. The use of wires operating in opposing directions and having oppositely directed rotations significantly reduces the non-linearity effect inherent in twisted wire actuation, resulting in a system having a good level of motion linearity as a function of control input impulse. The use of multiple twisted wires attached to the actuated element at different angles, enables the implementation of robotic systems with multiple degrees of freedom. Several experimental actuators verify these results.

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